UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF COMMERCIAL FISHERIES

CALIFORNIA FISHERY MARKET NEWS MONTHLY SUMMARY

SEPTEMBER 1969

PART II–Fishing Information*

Sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists

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U. S. Department of the Interior
Bureau of Commercial Fisheries
Fishery-Oceanography Center
P. O. Box 271
La Jolla, California 92037

*Part 1 - "Fishery Products Production and Market Data" is issued by the Bureau of Commercial Fisheries, Market News Service, U. S. Custom House, Terminal Island, California

R/V DAVID STARR JORDAN COMPLETES 1969 ALBACORE SURVEY CRUISE

R/V DAVID STARR JORDAN returned to San Diego on September 19 after completing a 32-day cruise covering the coastal region from Fort Bragg California, northward to the 49th parallel west of Vancouver Island, British Columbia (see plates 1 and 2). JORDAN's survey grid covered a distance of 3,300 miles; total round-trip distance from San Diego was 4,460 miles.

Although albacore catch rates were significantly lower than during the 1968 cruise (see August 1968 issue of this publication for details), the survey succeeded in fulfilling its stated objectives. The late-season distribution and availability of albacore and the influence of sharp fluctuations in the upwelling frontal zone on day-to-day events in the fishery was established. The effects of weather and climate on thermal properties of the upper mixed layer of the sea were also observed and interpreted for fishermen at sea who were listening to JORDAN's daily morning situation reports on 2638 kHz. Additional knowledge was gained with respect to albacore food habits in relation to standing stocks of forage organisms, and other vital statistics on the life history were assembled. One major objective, however, was not achieved: poor weather and sea conditions, coupled with poor catch rates, resulted in high hooking mortality, preventing the tagging and release of large numbers of fish.

Four lines were trolled during daylight for 5 to 14 hours on 22 days during the cruise, and on one additional day, the lines were fished for 2 hours without results. A total of 314 albacore tuna were caught on 16 of the 22 days; on 4 of these days, only 2 to 4 tuna were taken. The standardized catch rates (plates 1 and 2) showed that commercial concentrations of albacore were available but marginal on only 4 days during the cruise.[1] These concentrations of tuna were found along a line west of Brookings, Oregon, and south along the 128°20' W meridian to a point due west of Fort Bragg, California.

The only commercial-scale production potential of substantial duration occurred in the district west of Fort Bragg, California and Brookings, Oregon. On the northward bound portion of the cruise, catch rates of 125 fish per day and 132 fish per day were experienced on August 22 and 24 respectively in this area (plate 1). On revisiting the area in the September 13 to 16 interval, catch rates varied from 73 to 139 fish per day (plate 2). JORDAN did not encounter equivalent catch rates in any other area during the cruise. Commercial fishing

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[1]The generally-accepted minimum for "good" commercial fishing for jigboats is 100 fish per day, or approximately 1 fish per line-hour.

did not take place in this district because the weather in August was too rough and windy to permit significant fishing effort. Consequently the fleet expended the bulk of its effort in other areas until the mid-September interval. JORDAN's return to the district occurred just as the strong northerly wind regime had terminated. On the morning of September 16, JORDAN broadcast the location of a major area of albacore "jumpers" to the fleet which was anchored in the nearby ports of Eureka, Crescent City, and Fort Bragg at the time. Two days later a fleet of over 100 boats had entered the area, and reported catch rates varying from 100 fish per day to over 1,000 fish per day for jigboats. Two bait-boats each reported 2,000-fish scores for 2 consecutive days around September 18 and 19.

During the time that R/V JORDAN was first sampling the southern sector of the survey grid a major concentration of albacore tuna was being fished commercially off Washington. As JORDAN advanced northward the center of the concentration of tuna shifted to an area off northwestern Vancouver Island. JORDAN may have come near this concentration on its northernmost track; however, she passed through part of the fishing fleet at night on this leg of the survey, and probably did not sample adequately the only other area on the coast where large numbers of albacore may have been present.

The sea surface temperature and meteorological analyses of the laboratory's Fishery-Oceanography Group show that, on the average, the late August-early September period was several degrees colder than the same period in 1968 along a wide band off Washington and to the south. The mean gradient winds were stronger and upwelling was more intense. Off Cape Flattery and Vancouver Island, sea surface temperatures were about the same as last year.

Although the weather was windier than the average during the interval, and despite passage of a strong frontal system on August 25 and 26, JORDAN's day-to-day sampling of the nearshore zone off Cape Mendocino and Cape Blanco took place in relatively calm weather. One consequence of the temporary abatement of sustained northerly winds was the return, in a very few hours, of a thin veneer of warm oceanic water over the newly-upwelled cold water. In addition, JORDAN found large areas north of the Columbia River where the warm upper mixed layer was less than 10 meters deep.

Preliminary observations of organisms ingested by albacore showed post-larval and juvenile anchovies to be the major food in the northern regions; pelagic crustacea were found in lesser amounts. Small squids and a few saury were also observed. These findings differ from the previous year's survey which showed pelagic shrimp (Sergestes sp.) and squid to be the most common foods in the area north of Cape Mendocino.

The longlining gear was not successful in catching albacore at the locations fished (see plates 1 and 2)--the total was 7 fish, of which 5 were shark-damaged (total or partial). Very large numbers of blue shark (Prionace glauca) were taken--the total was 552, together with 2 salmon shark (Lamna ditropus) and 1 pomfret (of the family Bramidae). The overall catch rate for albacore was 0.45/100 hooks, while that for blue shark was 35.8/100 hooks. The majority of the blue sharks were measured (range 69-200 cm) and approximately 80% of the catch were females. Squid was used for bait on all sets; five baskets of prime saury taken by night-light off Cape Johnson were also used on longline set no. 4.

Little was learned regarding the depth distribution of albacore because of the extremely poor longline catch rate. In part, the low catch rate reflected the character of the entire fishing season--spotty distributions of albacore and fast-moving, small schools. Immediately subsequent to two of the zero-catch sets, daylight trolling provided evidence that albacore were also not available to trolling gear. The operation of the longline gear did provide useful experience in anticipation of its use aboard JORDAN as the primary sampling method for bluefin tuna in a cruise scheduled for April-May 1970. The experience gained has resulted in plans for redesign and replacement of some of the gear.

October 7, 1969

Glenn A. Flittner, Leader
Fishery-Oceanography Group

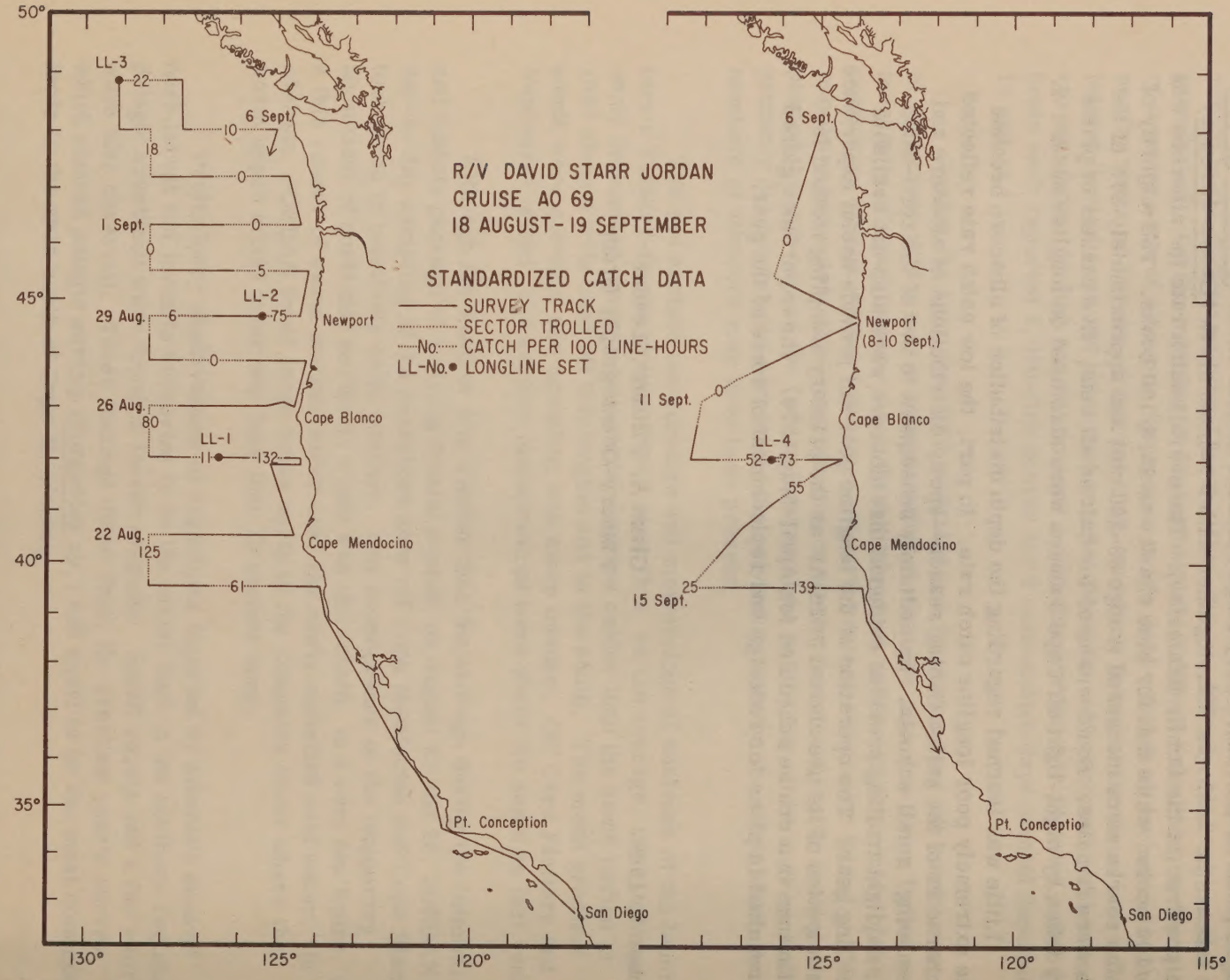


Plate 1.--Northbound cruise track of R/V DAVID STARR JORDAN, August 18-September 6, 1969. Sectors trolled and standardized catch rates in numbers of fish per 100 line-hours are indicated along track.

Plate 2.--Southbound cruise track of R/V DAVID STARR JORDAN, September 6-19, 1969. Sectors trolled and standardized catch rates in numbers of fish per 100 line-hours are indicated along track.

AUTOMATION SPEEDS SEA TEMPERATURE SUMMARIES

Long-time readers of this publication will observe changes in Figure 4 of this issue: a computer-driven automatic plot of individual sea temperature averages has replaced the former hand-plotted data. The same plot program is now being used to plot the digital data for Figure 1 prior to hand analysis of the isotherm field.

This advance represents one phase of a long-term project to automate the routine summary and analysis of environmental data which is now being performed by hand. Approximately 8 man-hours of labor will be saved each month in the preparation of Figure 1, and approximately 7 man-hours will be saved in the preparation of Figure 4. Additional labor savings will be realized later on when a comprehensive computer operations program, which is now in the process of construction, is completed and debugged.

October 8, 1969

Glenn A. Flittner, Leader
Fishery-Oceanography Group

SEA SURFACE TEMPERATURE CHARTS, EASTERN PACIFIC OCEAN
SEPTEMBER 1969

Acknowledgements

The following organizations and stations contributed data for the September 1969 charts:

U.S. Bureau of Commercial Fisheries Biological Laboratories La Jolla, California, Honolulu, Hawaii and Seattle, Washington
U.S. Coast Guard Cutter ACUSHNET, COMANCHE
U.S. Naval Weather Service, Fleet Numerical Weather Central, Monterey, California
Environmental Science Services Administration
U.S. Weather Bureau, San Diego, California
U.S. Coast and Geodetic Survey, Pacific Marine Center, Seattle, Washington
Hopkins Marine Station, Pacific Grove, California, J. P. Balesteri
Inter-American Tropical Tuna Commission, La Jolla, California
Inter-American Geodetic Survey by David Ortega at Manzanillo, Mexico; D. Chaves at Talara, Peru; E. Portocarrero at San Juan, Peru
Kelco Company, San Diego, California
LMR Inc., San Diego, California
Matson Navigation Company, San Francisco; S.S. CALIFORNIAN
Oregon State University, Corvalis, Oregon
Pacific Missile Range, Range Operations Department, Geophysics Division Point Mugu, California
Pacific Oceanographic Group, Nanaimo, British Columbia, by H. J. Hollister from observations by G. C. Wilks at Langara Island Light; P. H. Wipperman at Cape St. James Light; Lily Collins at Kains Island Lightstation; O. A. Edwards at Amphitrite Point Light.
Scripps Institution of Oceanography, La Jolla, California by Margaret Robinson
Scripps Institution of Oceanography Research Vessels; ALEXANDER AGASSIZ, THOMAS WASHINGTON, ARGO
Fishing Vessels; MARTINAC, TYPHOON

Charts

Figure 1. --Mean sea surface temperatures (°F) derived from approximately 8000 observations. Squares show temperatures at weather ship stations. Numerals on shore are temperatures at coastal and lightship stations.

Figure 2. --Deviation of sea surface temperatures (°F) from long term charts of H. O. 225. Hatched areas are colder in 1969.

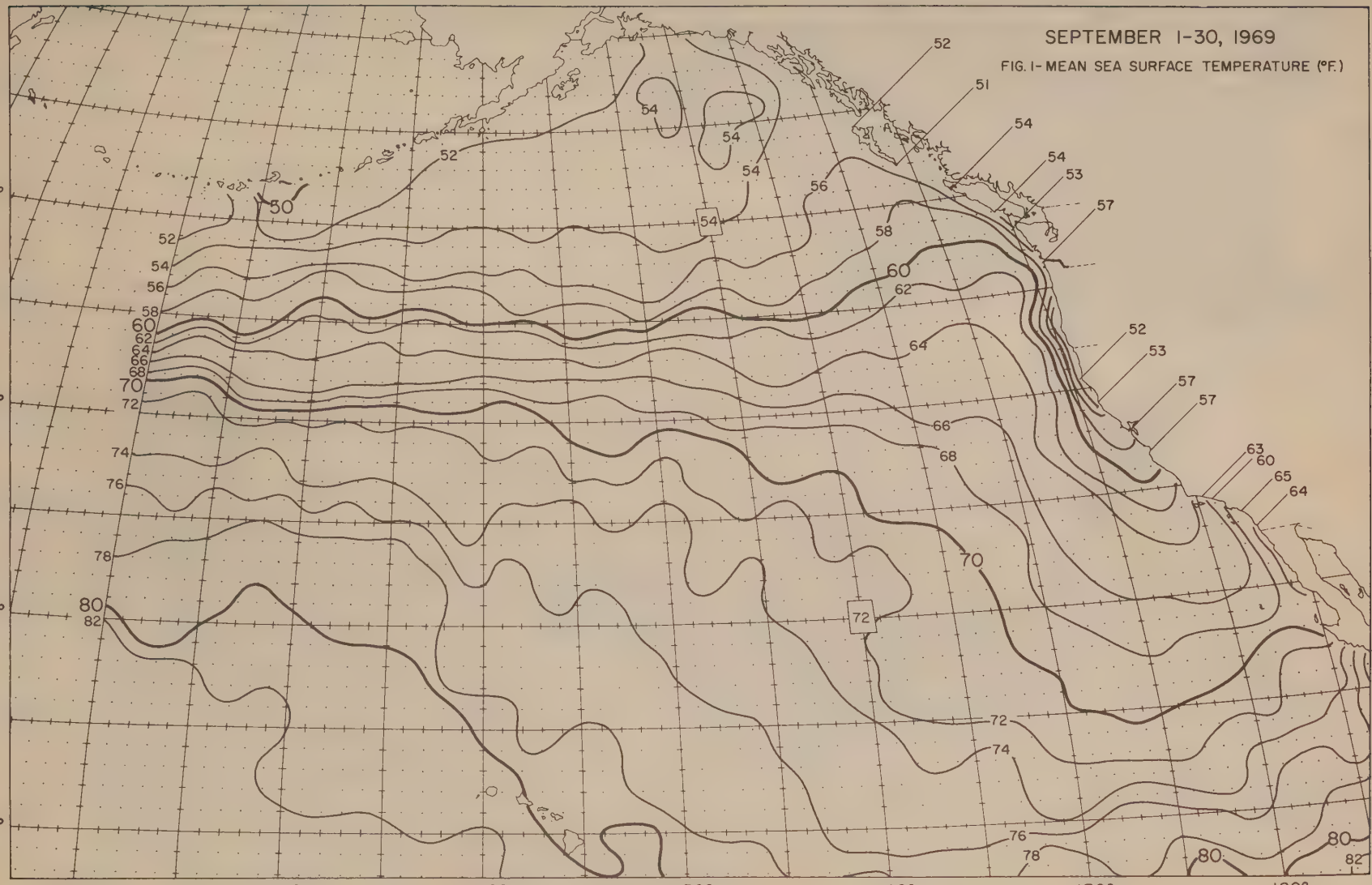
Figure 3. --Deviation of sea surface temperatures (°F) from those of September 1968. Hatched areas are colder in 1969.

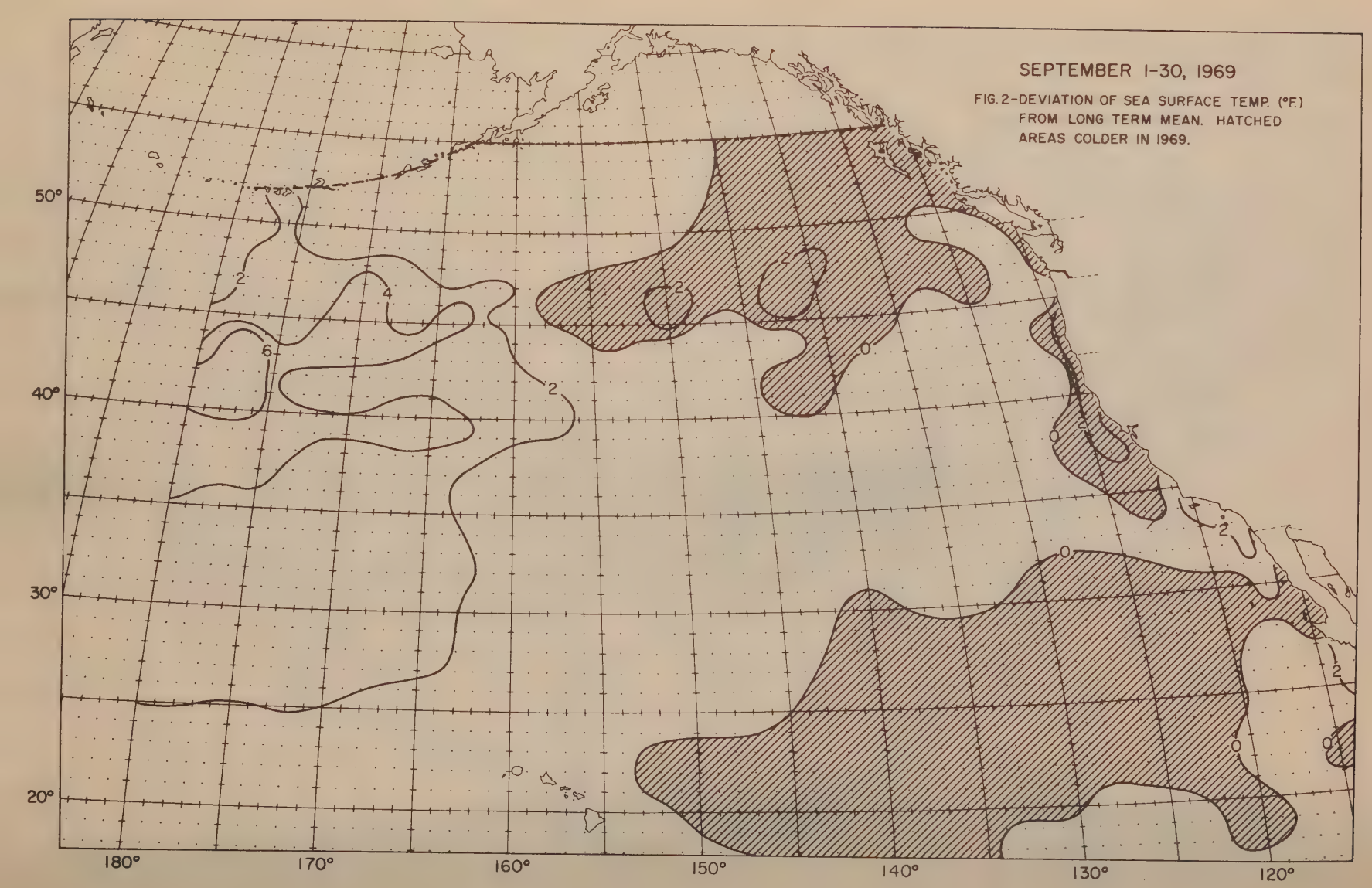
Figure 4. --Sea surface temperatures (°F) by 1-degree squares, approximately 2000 observations. Line under temperatures indicates average of two or more observations. Numerals on shore are temperatures at coastal stations.

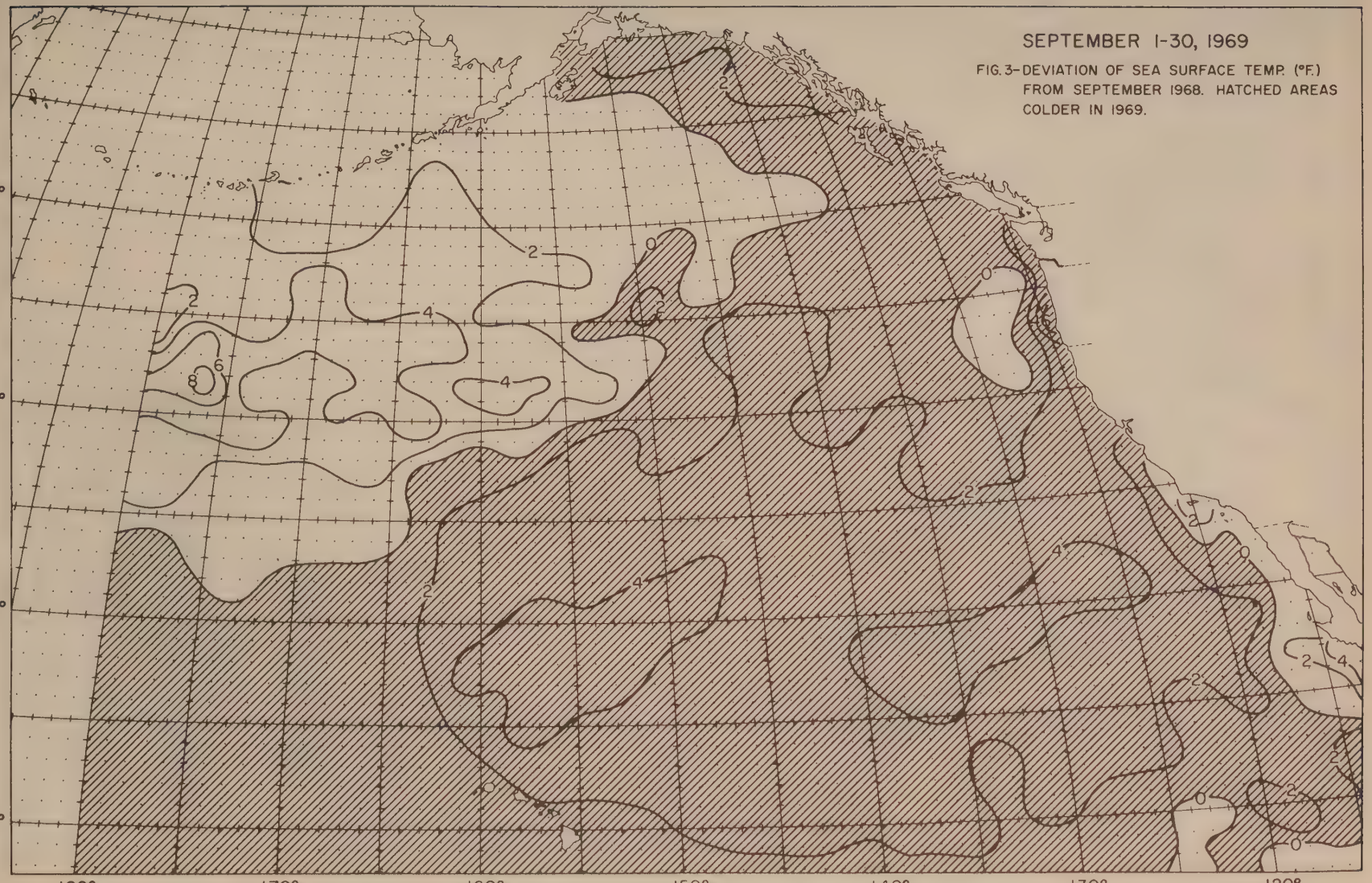
Figure 5. --Deviation of sea surface temperatures (°F) September 1969-September 1968 by 1-degree squares. Shaded areas are colder in 1969.

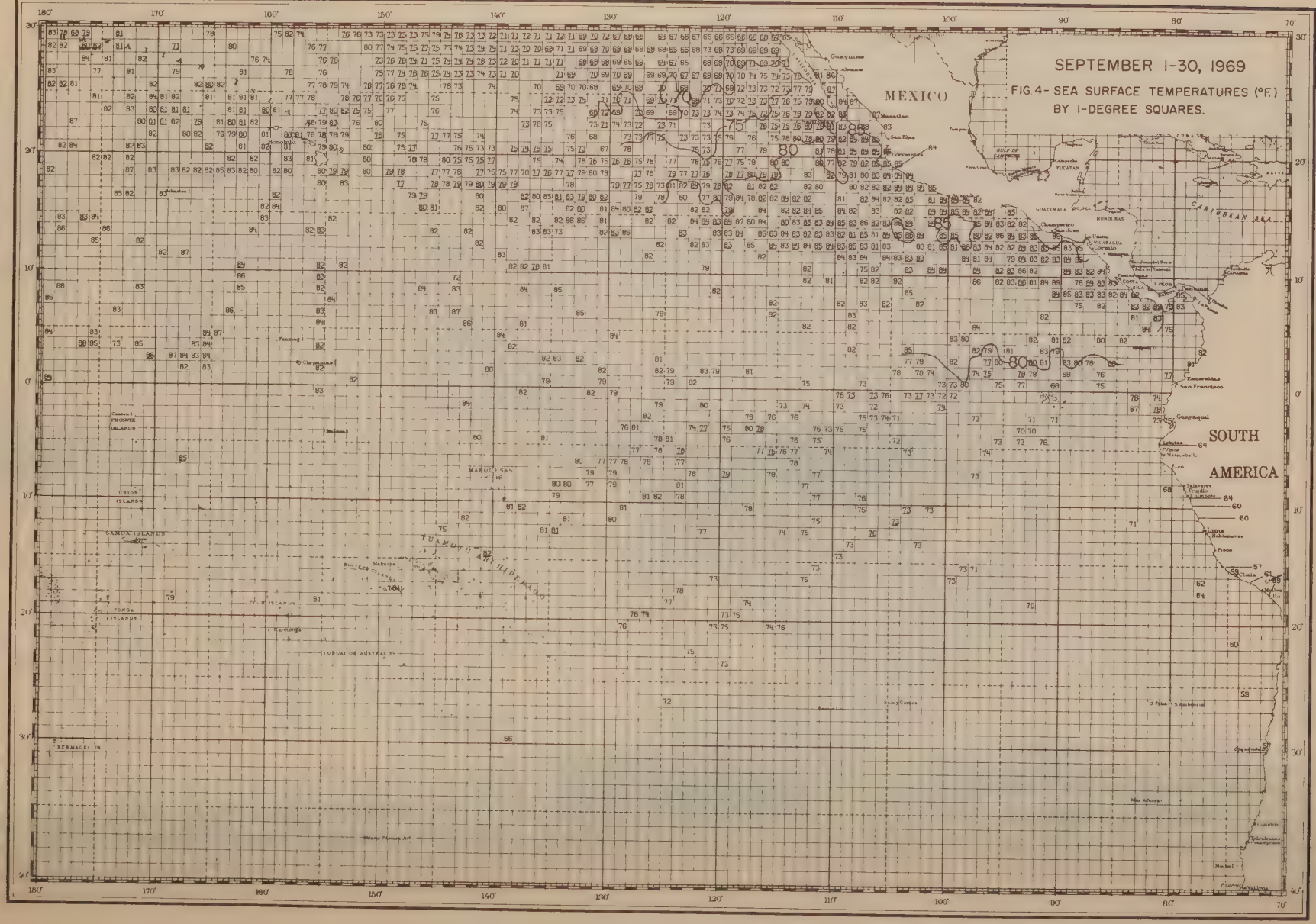
Figure 6. --Deviation of sea surface temperatures (°F) from 12-year mean (1947-1958) by 2-degree squares. Shaded areas are colder in 1969.

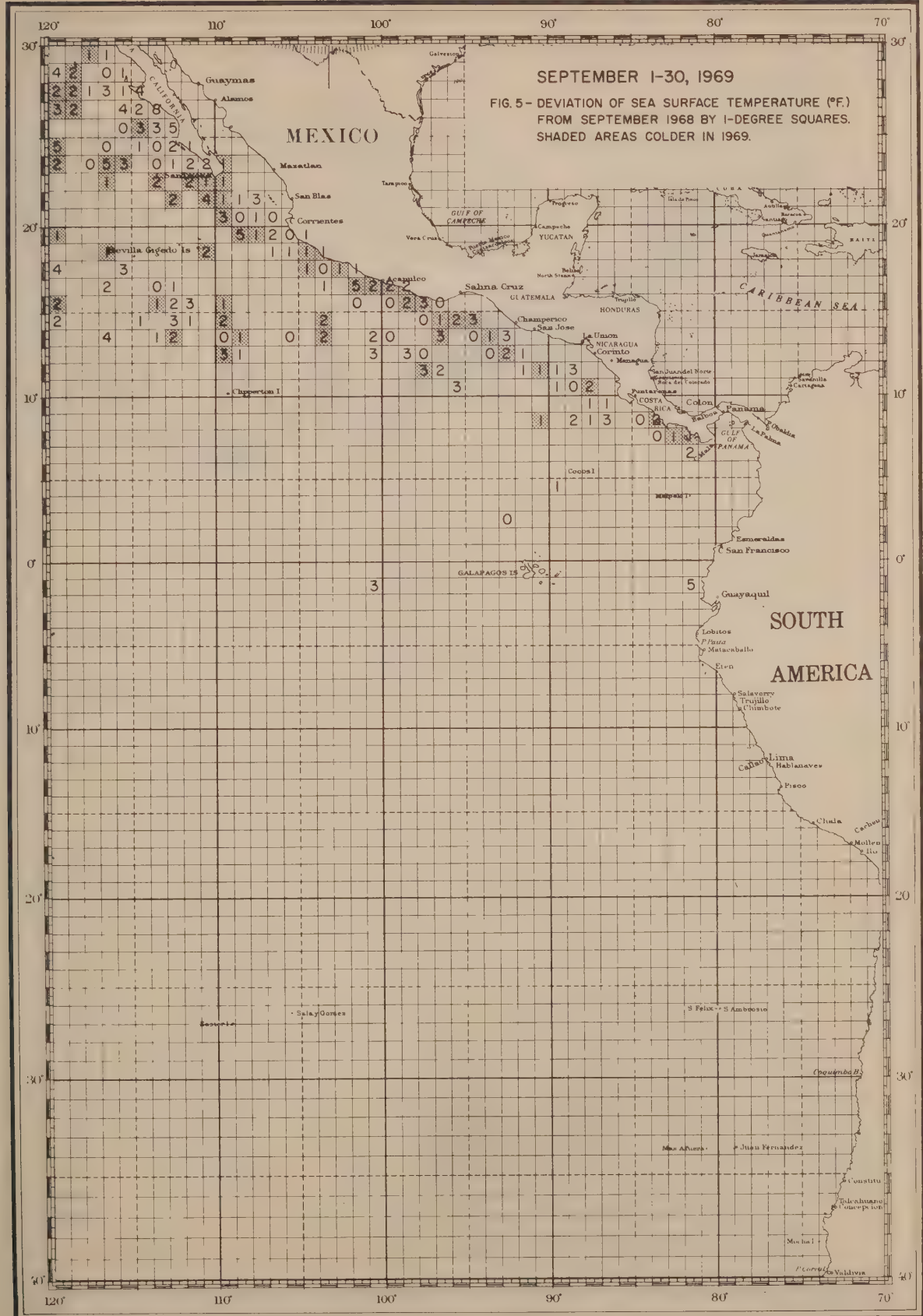
James A. Renner, Fishery Biologist
Kenneth S. Raymond, Scientific Illustrator
October 7, 1969

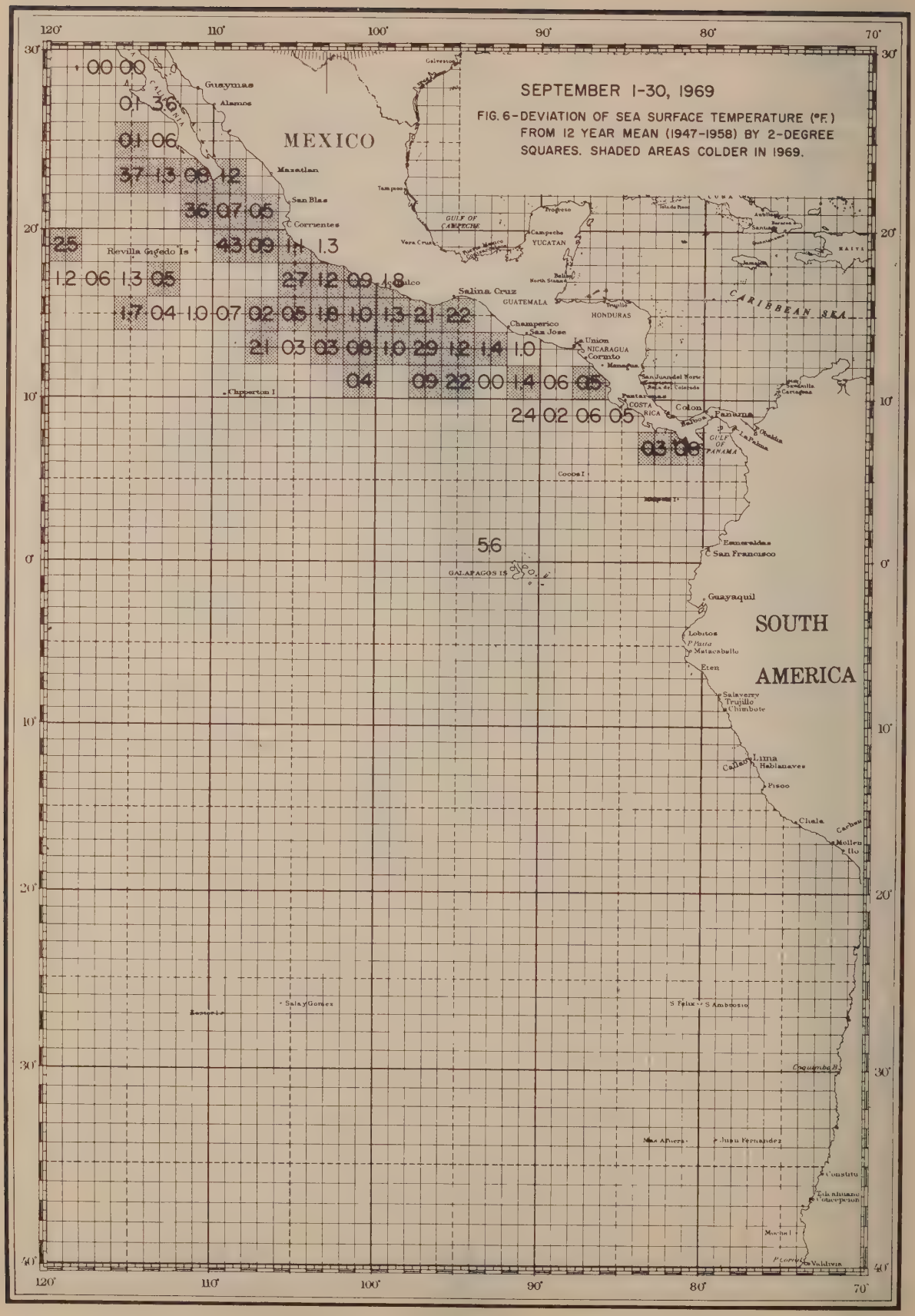

SEPTEMBER 1-30, 1969
FIG. 1- MEAN SEA SURFACE TEMPERATURE (°F.)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

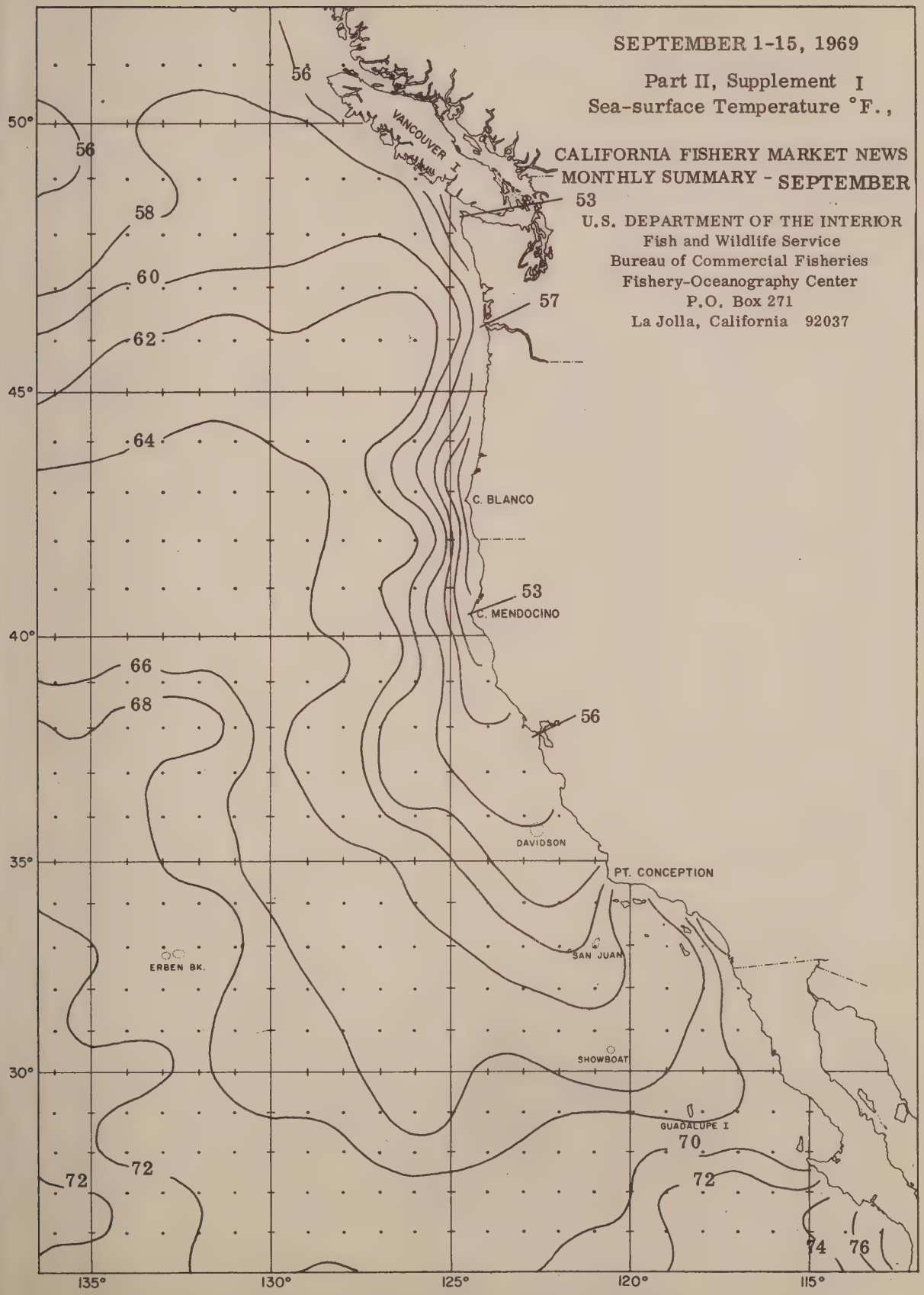

SEPTEMBER 1-30, 1969
FIG. 2-DEVIATION OF SEA SURFACE TEMP. (°F.) FROM LONG TERM MEAN. HATCHED AREAS COLDER IN 1969.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
2
4
6
0


SEPTEMBER 1-30, 1969
FIG. 3-DEVIATION OF SEA SURFACE TEMP. (°F.) FROM SEPTEMBER 1968. HATCHED AREAS COLDER IN 1969.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


SEPTEMBER 1-30, 1969
FIG. 4- SEA SURFACE TEMPERATURES (°F.)
BY 1-DEGREE SQUARES.
MEXICO
SOUTH
AMERICA
CARIBBEAN SEA
GULF OF MEXICO
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
CUBA
Guaymas
Mazatlan
San Jose
Acapulco
Salina Cruz
Tampico
Veracruz
Progreso
Belize
Puerto Cortes
Limon
Colon
Panama
Guayaquil
Salaverry
Trujillo
Chimbote
Lima
Huacho
Pisco
San Francisco
Temperaldes
Manta
Cocos I.
Galapagos Is.
Clipperton I.
Revillagigedo Is.
Socorro I.
Cantil I.
Roca Partida
Islas Marias
Tres Marias Is.
Islas Tres Marias
Banco Magdalena
Banco Gorda
Banco Alijos
Banco Nazca
Banco Orca
Banco Carnegie
Banco Albatross
Banco Dolphin
Banco Sala y Gomez
Isla de Pascua
Easter I.
Juan Fernandez Is.
Islas Juan Fernandez
Isla Robinson Crusoe
Isla Alejandro Selkirk
Isla Sala y Gomez
Isla San Ambrosio
Isla San Felix
Isla Desventuradas
Isla Mocha
Isla Santa Maria
Isla Mas Afuera
Isla Mas a Tierra
Isla Juan Bautista
Isla Chiloe
Isla Guafo
Isla Huafo
Isla Wellington
Isla Madre de Dios
Isla Navarino
Isla Hoste
Isla Grande de Tierra del Fuego
Isla de los Estados
Isla Staten
Isla Diego Ramirez
Isla Clarence
Isla Snow
Isla Low
Isla Deception
Isla Livingston
Isla Elephant
Isla Gough
Isla Inaccessible
Isla Nightingale
Isla Tristan da Cunha
Isla Amsterdam
Isla St. Paul
Isla Kerguelen
Isla Heard
Isla Macquarie
Isla Auckland
Isla Campbell
Isla Antipodes
Isla Bounty
Isla Chatham
Isla Pitt
Isla Norfolk
Isla Lord Howe
Isla Rapa
Isla Pitcairn
Isla Henderson
Isla Ducie
Isla Oeno
Isla Marcus
Isla Macauley
Isla Raoul
Isla Curtis
Isla Sunday
Isla Raoul
Isla Kermadec
Isla Tonga
Isla Fiji
Isla Samoa
Isla Cook
Isla Niue
Isla Tokelau
Isla Phoenix
Isla Union
Isla Canton
Isla Enderbury
Isla Christmas
Isla Fanning
Isla Washington
Isla Palmyra
Isla Jarvis
Isla Howland
Isla Baker
Isla Gardner
Isla Hull
Isla Mc Kean
Isla Nikumaroro
Isla Sydney
Isla Phoenix
Isla Hull
Isla Enderbury
Isla Canton


SEPTEMBER 1-30, 1969
FIG. 5 - DEVIATION OF SEA SURFACE TEMPERATURE (°F.) FROM SEPTEMBER 1968 BY 1-DEGREE SQUARES. SHADED AREAS COLDER IN 1969.
MEXICO
CALIFORNIA
Guaymas
Alamos
Mazatlan
San Blas
Corrientes
Acapulco
Salina Cruz
GUATEMALA
HONDURAS
Champerico
San Jose
La Union
NICARAGUA
Corinto
Managua
Chipperton I
COSTA RICA
Colon
Panama
Balboa
GULF OF PANAMA
Coopsl
Esmeraldas
San Francisco
GALAPAGOS IS
Guayaquil
SOUTH AMERICA
Lobitos
Talara
Eten
Salaverry
Trujillo
Chimbote
Callao
Lima
Hablanave
Pisco
Chala
Mollendo
Salas y Gomez
S Felix
S Ambrosio
Juan Fernandez
Valdivia
CARIBBEAN SEA
GULF OF CAMPECHE
YUCATAN
HAITI
Progreso
Campeche
Vera Cruz
Tampico
Galveston
Trujillo
Cartagena
Puntarenas
Coquimbo
Constitu
Talcahuano
Concepcion
Corral


SEPTEMBER 1-30, 1969
FIG. 6-DEVIATION OF SEA SURFACE TEMPERATURE (°F.) FROM 12 YEAR MEAN (1947-1958) BY 2-DEGREE SQUARES. SHADED AREAS COLDER IN 1969.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF PANAMA
GALAPAGOS IS
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°


SEPTEMBER 1-15, 1969
Part II, Supplement I
Sea-surface Temperature °F.,
CALIFORNIA FISHERY MARKET NEWS
MONTHLY SUMMARY - SEPTEMBER
U.S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Fishery-Oceanography Center
P.O. Box 271
La Jolla, California 92037
50°
45°
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35°
30°
135°
130°
125°
120°
115°
56
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68
70
72
74
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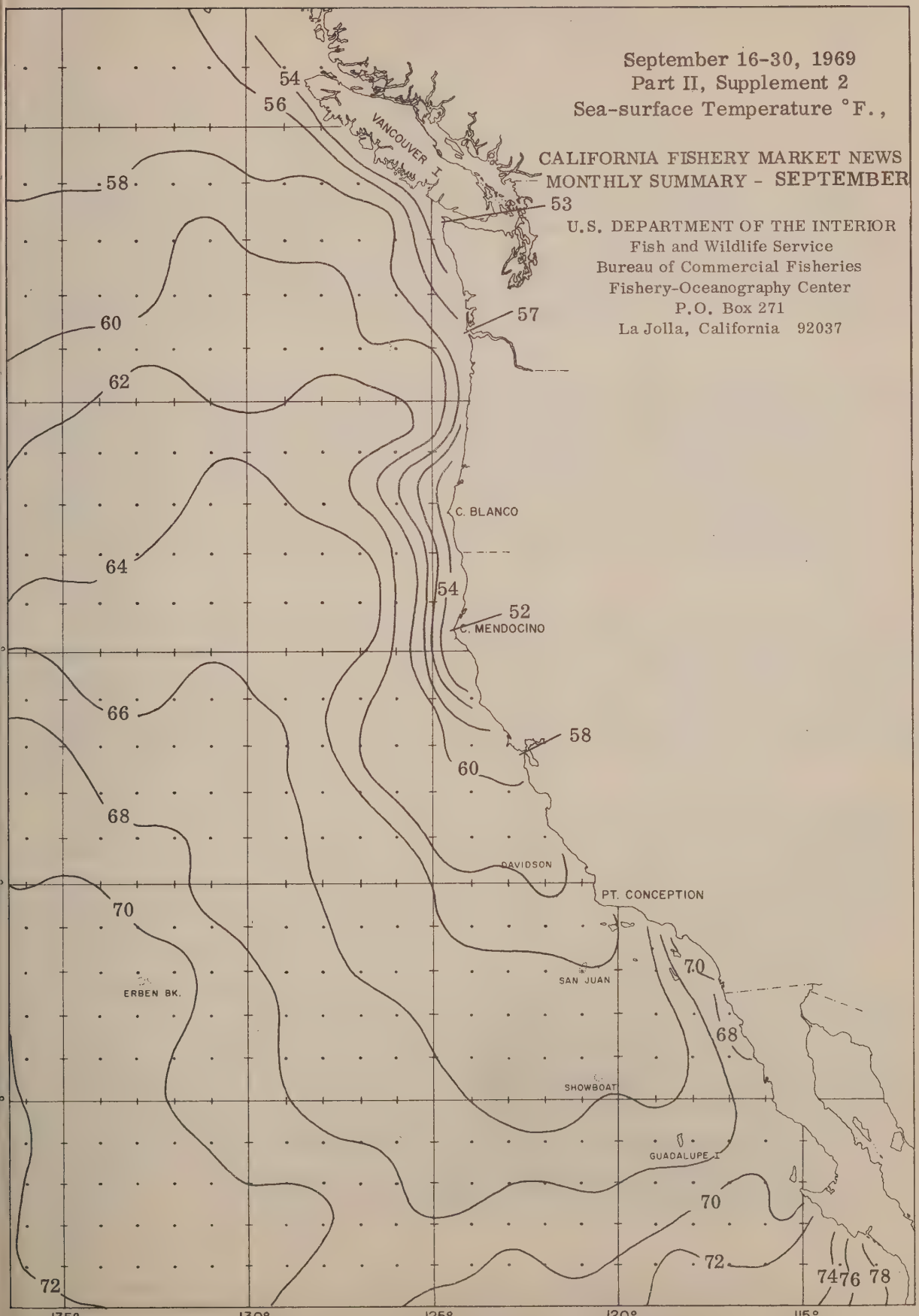
53
57
VANCOUVER I.
C. BLANCO
C. MENDOCINO
DAVIDSON
PT. CONCEPTION
SAN JUAN
SHOWBOAT
GUADALUPE I
ERBEN BK.


September 16-30, 1969
Part II, Supplement 2
Sea-surface Temperature °F.,
CALIFORNIA FISHERY MARKET NEWS
MONTHLY SUMMARY - SEPTEMBER
U.S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Fishery-Oceanography Center
P.O. Box 271
La Jolla, California 92037
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VANCOUVER I.
C. BLANCO
C. MENDOCINO
DAVIDSON
PT. CONCEPTION
SAN JUAN
ERBEN BK.
SHOWBOAT
GUADALUPE I.
135°
130°
125°
120°
115°

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
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BULLETIN NO. 69-7

1969 ALBACORE FISHING ACTIVITY REACHES PEAK

Albacore fishing activity finally reached peak levels during the second half of August. Excellent fishing conditions developed off the southwest coast of Vancouver Island in the third week of the month, establishing the farthest northward penetration of the commercial fishery since 1959. Weather conditions were good during the interval, and many boats reported averaging 200-400 fish per day during a 15-20 day period. The district 40-60 miles off the Washington coast also has yielded excellent catches, and until the squally weather on August 23-24, when the baitboat THREE HAWKS capsized, high scores prevailed.

Landings trends during August offer some encouragement with respect to annual production: an estimated 18-21 million pounds (9,000-10,500 tons) will be tallied by Oregon and Washington. Oregon will have received between 15 and 18 million pounds. Washington expects 2-3 million pounds in August. Landings for the season in that state are expected to be the highest since 1950. California totals remain among the lowest on record; an influx of over 300 tons into Eureka during the pre-Labor Day weekend will swell California's August landings totals appreciably. The southern California albacore fishery continues to remain a "bust." Consequently, August landings are expected to fall between only 1 and 4 million pounds.

Weatherwise, conditions have generally been good to excellent in the district from Cape Blanco to Cape Flattery. A rapidly-moving frontal system entered British Columbia on August 23-24, wreaking havoc with boats operating off Vancouver Island; however, this storm system did not seriously affect operations south of Grays Harbor, Washington. Normal late summer intensification of the thermal trough over interior valleys and deserts in California generated strong to very strong northwesterly winds off central and northern California during the period. Consequently, fishing operations were severely restricted in this district during the interval.

Sea surface temperatures appear to be commencing their annual decline in the area north of the Columbia River. Intermittent rough weather associated with fast-moving frontal systems is expected to accelerate heat loss to the atmosphere during the first half of September. The fleet reports that fishing is becoming more spotty as albacore schools break up and become harder to locate, and many boats are beginning to move south to fish in southern Oregon and northern California waters where albacore remain relatively abundant and accessible during good weather.

The outlook for early September is good. The fishery off Vancouver Island and Washington will exhibit a further decline as bad weather commences to close in on this district. Oregon and northern California waters should yield at least 2-3 weeks more of good production before adverse weather commences to settle into this area also. Season landings totals are yet difficult to predict, but with the near-record totals already tallied for August in the Pacific Northwest, it appears as if the carryover into September should place the 1969 year between 30 and 40 million pounds (15,000-20,000 tons) for the U.S. west coast. (Landings in British Columbia ports could add appreciably to this figure.)

October weather, always marginal at best, may permit additional "scratch" fishing in Oregon and northern California waters. With a middling production year in prospect, albacore fishermen are well advised to stay with the albacore as long as good weather prevails.

Filed at sea aboard
R/V DAVID STARR JORDAN
September 1, 1969

Staff, Fishery-Oceanography Program
Glenn A. Flittner, Leader

UNITED STATES DEPARTMENT OF THE INTERIOR
U. S. FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES
Fishery-Oceanography Center
La Jolla, California 92037

BULLETIN NO. 69-8

1969 ALBACORE PRODUCTION REMAINS BEHIND LAST YEAR'S LEVELS

The 1969 albacore tuna production has fallen behind levels established at the same time last year. U. S. west coast landings are estimated to total about 27-29 million pounds (13,500-14,500 tons) by mid-September, or about 7-8 million pounds (3,000-4,000 tons) behind last year. Oregon-Washington landings are estimated to comprise about 24-25 million pounds (12,000-12,500 tons) of the total, slightly below those of last year. California landings are estimated at 3-4 million pounds (1,500-2,000 tons).

The landings outlook for Oregon-Washington is poor for the remainder of the 1969 season. Deliveries to Pacific Northwest ports reflected a sharp drop in production in northern waters during the past week. Unless conditions improve substantially, this slowdown suggests that production in Oregon and Washington will level off between 26 and 30 million pounds (13,000-15,000 tons) for the season. California landings, still among the poorest on record, should improve in September. The center of fishing activity has shifted southward, and landings have picked up in northern and central California ports. Many California boats fishing in Pacific Northwest waters are expected to return home with partial fares, thus adding appreciably to season totals. California is expected to tally over 8 million pounds (4,000 tons) for the 1969 season.

Fishing conditions on the northern grounds have favored baitboats in the past 2 weeks; these boats have only recently begun to report scores of 500-1,000 fish per day. Nevertheless, fishing stops have been reported as short on small, fast-moving schools. Jigboats have experienced poor fishing for over 3 weeks. Few scores above 200 fish per day have been reported from all districts, and the rule has been about 100 fish per day in the north and 40-80 per day in the south.

R/V DAVID STARR JORDAN has found that albacore tuna are widely scattered along the northern portion of the U. S. west coast; the only significant concentrations of fish were found in a zone 60-150 miles offshore from Fort Bragg, California to Brookings, Oregon. The albacore's food supply in most of the region surveyed appeared to be relatively scarce, and may partially explain why the schools have apparently moved from place to place so quickly. The fleet has experienced great difficulty in staying "on the fish" in all districts this year except for about 20 days in a narrow band of water off Vancouver Island where these fish were feeding on shrimp and squid. This area accounted for the bulk of August production in the Pacific Northwest.

Weather conditions have been fair-to-good in the past 2 weeks only off northern and central Oregon. Farther north, fog and rain associated with several Gulf of Alaska storm systems hampered operations off Vancouver Island. Washington weather cleared near the end of the first week of September, permitting the fleet to return briefly to the northern grounds. In southern Oregon and northern California, persistent northwesterly winds from 25-35 knots lashed the area for the past 2-week period. Winds and seas were moderate off central and southern California allowing renewed fishing efforts in these regions.

Sea surface temperatures have cooled slightly from the August 16-31 interval. Most areas remain cooler than our 9-year normal; the present 15-day sea surface temperature chart is considerably cooler than the same one of last year, especially off the Pacific Northwest. R/V DAVID STARR JORDAN'S survey has revealed the upper mixed layer to be very shallow off Vancouver Island and Washington, where thermocline depths ranged from 30 to 60 feet. Off southern Oregon and northern California, little change has occurred in the oceanic water outside the broad upwelling zone; mixed layer depths have ranged from 120 to 180 feet during the past month.

The outlook for the next 2 weeks calls for continued cooling of the upper layer of the sea as the annual late-September decline commences. In the Pacific Northwest, the very thin veneer of warm water may disappear quickly once an intense storm system moves over the area, at which time the 60°F. isotherm will shift rapidly southwestward. Albacore tuna already appear to be moving to the south in this district. The normal relaxation of the North Pacific High, in association with cooling in the Pacific Southwest interior region, should reduce wind gradients sufficiently to permit access to northern California offshore areas where R/V JORDAN has found albacore. Landings in Oregon should show a slight increase over present totals, while California landings should rise sharply. At this writing, it appears that U. S. west coast albacore production will fall between 34 and 42 million pounds in 1969.

Filed at sea aboard
R/V DAVID STARR JORDAN
September 15, 1969

Staff, Fishery-Oceanography Group
Glenn A. Flittner, Leader

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES
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BULLETIN NO. 69-9

ALBACORE SEASON BEGINS EARLY DECLINE

Albacore tuna fishing activity experienced an early decline during the second half of September. Fishing activity dropped off sharply in the Oregon-Washington area as a series of early fall storms began to enter the Pacific Northwest coast on September 16-17. During most of the period, heavy seas and strong winds kept the fleet in port. South of Cape Mendocino, however, fishing activity picked up considerably. Northern California ports recorded substantial increases in landings whereas to the north, tuna landings declined to a mere trickle.

Fishing conditions were generally poor for the entire 2-week interval north of Cape Blanco. Fishing terminated completely off Vancouver Island and Washington early in the third week of the month, whereas in Oregon, a few baitboats remained in a small area between Cascade Head and Newport before coming south. Oregon weather was poor until after September 25, when a few baitboats resumed limited fishing activity near shore as far north as the Columbia River. Weather conditions were favorable in Northern and Central California, and a major center of activity developed off Fort Bragg and Point Arena subsequent to the passage of R/V DAVID STARR JORDAN through that district on September 15 and 16. Here a large area of school fish was discovered from 80 to 160 miles offshore. Catches in the period commencing on September 16 and ending on September 26 ranged from 100 fish per day to over 1,000 fish per day for a large fleet of jigboats; two baitboats reporting from this district had each tallied 2,000-fish scores for 2 consecutive days around September 18 and 19. In Southern California, catches remained poor but scattered activity was reported by sportboats off San Diego and by commercial boats from Rodriguez Dome to an area 40 to 50 miles off Morro Bay.

Weatherwise, the fall season was well underway in the Pacific Northwest by the end of the fourth week of the month. A persistent upper air trough over the Pacific Coast has steered a series of storms into the Pacific Northwest and the northern Rockies. Except for the last 5 days, the Oregon-Washington area experienced bad weather during the interval beginning on September 16. The procession of storms entering the Northwest resulted in declining temperatures inland, lessening the onshore flow considerably; consequently, Northern and Central California offshore areas experienced fog and calm to variable wind conditions. Southern California offshore areas remained accessible to the fishing fleet except for the so-called "wind tunnel" 5 to 50 miles off Point Conception.

Sea surface temperatures continued to fall in the Pacific Northwest region as strong winds and turbulent mixing prevailed. The 60° F isotherm moved rapidly southwestward in the area north of the Columbia River, whereas to the south, brisk winds caused an upwelled zone to increase in breadth from Cape Blanco to the Oregon-California border, causing the 60° isotherm to bulge offshore approximately 40 to 60 miles. Slack winds in Northern and Central California offshore regions resulted in cessation of intense upwelling in this area, and the warm oceanic water has slipped rapidly coastward.

The outlook for the next 2 weeks is for continued cooling of the upper mixed layer in all areas north of Cape Mendocino. Continued placement of the upper air trough over the Pacific Coast will cause fall storms to enter the Pacific Northwest at frequent intervals. Northern and Central California offshore weather will remain good as long as pressures in in the Great Basin do not cause Santa Ana wind conditions to arise. Albacore tuna remain abundant in the district from Cape Blanco south to Point Arena, but "jumper" schools will have to be induced to bite before they commence their offshore migration. All boats should anticipate having to move farther offshore once the annual exodus gets underway, weather permitting. Season landings in Oregon and Washington should level off but California totals should continue to rise as long as good weather permits the fleet to remain on the grounds.

September 30, 1969

Staff, Fishery-Oceanography Group
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